To the average observer it is the least interesting of any portion of the contest in that it is very difficult for the average layman to calculate just what is being done. In order that our readers may in general understand what a brake test means we give a reproduction of the explanation of the brake as it appeared in our August, 1909, issue. A concrete problem is worked out which greatly aids the explanation.

The brake consists of two iron pulleys mounted on, and keyed to a 4-inch shaft. This shaft is carried by two large bearings on a wooden frame. The pulley marked A is 40-inches in diameter by 16-inches face and on this pulley the belts are run. The other Pulley B is 58 inches in diameter by 18 inches face, and is flanged both on the inside and rim with flanges outside of the projecting 2 inches. Around this pulley is wrapped 4 folds of 1¼ inch rope. Rope No. 1 is fastened to an oak block and goes once around the pulley B, and then around the small pulley C, and back around B again, and then around small pulley D, around B again then around small pulley E and once more around B and then fastens into the oak block again. By this arrangement fo small pulleys the starin is equalized on all the ropes. The oak block at the top is carried by a hook bolt to the dynamometer, and the dynamometer is carried by a hook and long bolt to the frame work. The lower oak block to which the two pulleys C and E are attached has a long bolt through it to which rae attached a number of 25 pound nesting weights. These nesting weights rest on a scale, and when the ropes are slack the full amount of the weights, bolts, etc., are on the scale. These pulleys revolve in the direction of the arrow so that the friction has a tendency to make all the slack of the ropes be delivered so as to allow the nesting weights to rest entirely on the scale. During the tests of the engines the pulleys were run from 200 to 400 revolutions per minute. Now if the screw G were tightened up sufficiently it would take up all the slack and have a tendency to lift the weights off the scale. Suppose an engine running at 240 revolutions per minute pulls down on the dynamometer 1300 pounds, and on the scale at the start there were 180 pounds and when running there are only 100 pounds shown on the scale, that means that the slack side of the ropes are tight enough to lift 80 pounds off the scale, or that of the 1300 pounds shown on the dynamometer 1220 are due to friction, and 80 pounds are due to the weights. This 1220 pounds multiplied by the velocity at which it would travel if it were a belt on the pulley would give us the amount of work being done, and if that were divided by 33000 would give us the horse power. For example, the pulley is 50 inches in diameter and the rope 1¼ inch, then the centre of the rope is 51¼ inches in diameter or 205 feet in

$$\frac{}{4 \times 12}$$

diameter and 205×22 feet in circumference, then the horse power would be at 240 revolutions per minute:

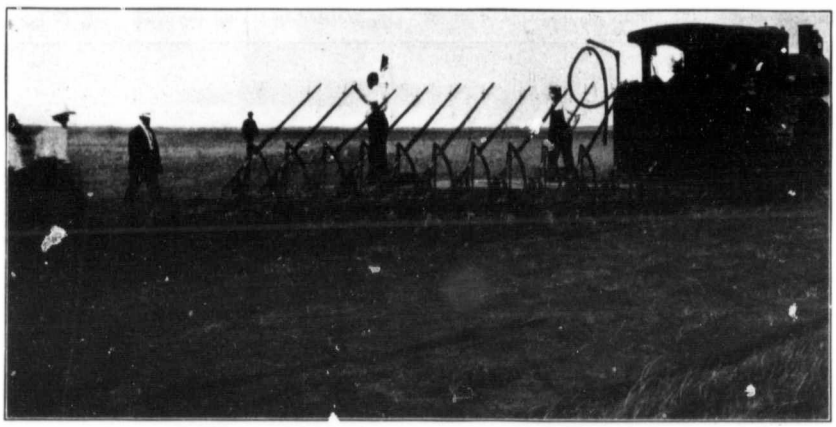
$$\frac{205 \times 22 \times 240 \times 1220}{48 \times 7 \times 33000} = 119$$

It can readily be seen that by tightening up on screw G any desired tension on the rope can be obtained and thus the friction between the pulley and the ropes increased.

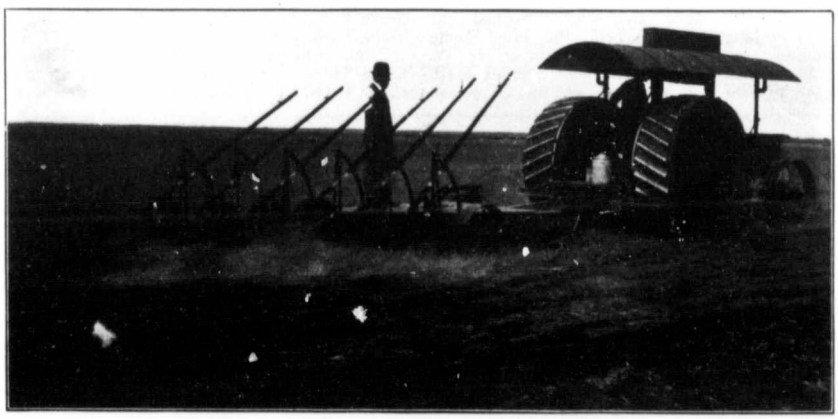
With this large amount of friction the ropes would soon burn if they were not kept cool. This is accomplished by a continuous stream of water being poured into the inside rim of the wheel, and at the same time an equal quantity is carried away by means of the funnel shown at J. This water could be made to boil if the supply were cut down and if cut off all together would soon evaporate, and then the rim of the wheel would become hot and burn the ropes.

The brake test lasted Wednesday, Thursday, Friday and Saturday by which time all of the engines were ready to go to the plowing field on Monday, July 18. There was no hauling test held this year owing to the difficulty of obtaining a suitable course and also because of the fact that the plowing test was so long and severe. A hauling test is valuable for some things, provided a suitable load can be secured but where the engines entered vary so greatly in horse power it is a very difficult matter to secure suitable loads that will accommodate the horse power of each engine. Last year some of the engines pulled loaded wagons and some of the larger engines pulled dead engines but in practically every case the load was not such as would give any very reliable data as to the tractive efficiency of the engine. At present, in Western Canada, the hauling proposition is not a very vital one although in England and in some places in the States it is assuming considerable importance. The time will doubtless come when the farmers of Western Canada will want to know the ton mile cost of hauling their farm products and will at the same time be interested in knowing the capabilities of the various engines on the market as regards their handling the haulage proposition. For this reason it would seem that if future motor contests are to be held that some provision should be made for holding a haulage test paying particular attention to suitable loads and suitable roads that will come somewhere near meeting the requirements of the farmer. If mechanical power is to take the place of the horse on the farm it must do it in every way possible and not least among these is hauling. The real hauling test should be held over a country road sufficiently varied that it would illustrate all possible conditions and where grades and soft spots would determine the 'peak loads."

The plowing test at the 1910 contest would have been a most remarkable affair but for the difficulty in obtaining water for the steam engines. Arrangements had been made with the C. P. R. to take water to the plowing field in tank cars but through some hitch a sufficient amount was not supplied to keep the steam engines going. Five trains per day were run from the Exhibition grounds to the plowing field and each and every one was loaded with people eager to see the biggest plowing contest ever held in the World's history. The plowing course was about 4900 feet in length and a plot of ground was allotted to each engine in the proportion of 3/10 of an acre per brake horse power. It was a sight that may never be witnessed again. From ten to twelve



The Avery 30 H.P. Steam Tractor Pulling a 12 Bottom 14-Inch Cockshutt Engine Gang



The Goold, Shapely & Muir 30 H.P. Gas Tractor Pulling an 8 Bottom 14-Inch Cockshutt Engine Gang